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SEPTEMBER 1963

Soil Conservation

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Fruit and Nuts

The acreage of land in fruit orchards, groves, vineyards, and planted nut trees is heavily concentrated in two States—California and Florida, which together accounted for more than half the total acreage used for these crops in 1959. California alone had a third of all acreage in fruits and nuts. In California a wide variety of fruits and nuts are grown including citrus fruits, deciduous fruits, grapes, walnuts, and almonds. Florida is principally important for its citrus production. Michigan is the third ranking State in acreage in orchardland, and is particularly known for its cherries, apples, and peaches. It is closely followed by Georgia with its peaches and pecans, Texas with its citrus and some pecans, and New York with its vineyards and its several other deciduous fruits. Washington and Oregon are important producers of apples and some of the other deciduous fruits such as pears. Pennsylvania has a less concentrated but significant fruit production, particularly apples.

—From 1959 U.S. Census of Agriculture special report on land utilitzation (Vol. V, Part 6, Chapter 1, p. 43) by U.S. Bureau of the Census in cooperation with USDA Economic Research Service.

We should so live and labor in our time that what came to us as seed may go to the next generation as blossom, and what came to us as blossom may go to them as fruit.

—H. W. BEECHER

COVER PICTURE.—Beauty and conservation distinguish Green Tree Orchard with its Ladino clover cover crop around the trees in California's Placer County Soil Conservation District.—Photo by Robert B. Branstead.

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FRANK B. HARPER, Editor

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Conservation Is Helping Family To $500,000 Orchard Income Goal

By Paul W. Ice

CONSERVATION and other modern methods have helped Ray and Claudean Grammer to build up a potential half-million-dollar apple and peach growing business from their start on a wornout 60-acre southern Illinois fruit farm in 1946.

The Grammer's 400-acre apple and peach growing operation in the hill country southeast of Murphysboro also is one of those that plays a big role in bolstering the local economy in this area. Grammer and his wife, cooperators of the Jackson County Soil and Water Conservation District since 1959, keep 8 to 10 employees the year around and hire 75 to 100 during harvest.

"We had a rough time the first 2 years," Grammer says, "but we're doing a more than $100,000 business, now. Within a few years, when our younger trees begin to bear, we expect to gross $500,000 a year."

Step inside Grammer's large packing shed today, and you will see an array of ultra-modern processing machinery. He plans to add a large cold storage plant in 1964. Across the road from the packing shed is the Grammers' modern ranch-type home—"our retreat after a 12- to 14-hour day." In compliance with migrant-labor laws, they also have built adequate modern housing to accommodate 76 employees.

They don't believe in going into debt; the business must pay its own way.

"We try to grow as our farm grows," Grammer explains. "We always take a good inventory of our crops before spending much money for improvements."

Grammer grew up on the same farm he now owns, picked apples there as a boy, and dreamed of some day owning his own orchard. When he and his wife started out, their equipment consisted of one team of horses, a mower, a wagon, and an old two-cycle spray rig. They bought 210 acres of the present 500-acre farm out of their savings in 1946, salvaging enough good trees from the 60 acres to get a start. The other 290 acres was added in 1956.

Much of Grammer's land in 1959 still was in cutover timber, which he wanted to clear and plant to fruit trees, but lack of water threatened to limit expansion. The Soil Conservation Service, through the Jackson County district, provided a soil capability map of the Grammer farm, showing the land that could be cleared safely and economically for new orchards. Grammer has cleared and planted all of this brushland but 15 acres, which will be cleared this fall.

SCS engineers investigated pond sites to provide additional water for orchard spraying and for irrigation during the critical dry periods; because the four existing small spray-ponds were shallow and full of water-weeds and moss. A large pond was built in 1960.

A diversion terrace brings in water to help fill the pond, which is stocked with bass and bluegill. Grammer can fill his spray-tanks by gravity flow at the rate of 100 gallons a minute. He estimates this saves more than $500 a year in time, labor, and money; because he formerly had to maintain electric pumps and screen and filter the water from each of the small spray-ponds.

Grammer thinks cover like this dense 1963 crop of annual field brome he's discussing with author may be answer in his area's peach orchards.

Grammer uses a rotary tiller to clean cultivate under trees to control weeds, mice, and insects and to conserve moisture.

The author is work unit conservationist, Soil Conservation Service, Murphysboro, Ill.

Five-year-old apple orchard being sprayed in 1963 by one of 5 machines used by Grammer. Cover crop is disked lightly each year and fertilized.

Grammer grows permanent cover crops in all of his orchards to control erosion and to improve soil tilth and water-holding capacity. He uses orchardgrass, fescue, and Ladino mixtures but likes orchardgrass best. During the past 2 years, Grammer cooperated with the SCS in planting trial-plots of annual field brome in his peach orchards, and plans to plant more of this grass for cover.

Grammer cultivates his orchards lightly—but not enough to kill his permanent cover crops—with special roto-tillers to get under the trees. This cultivation helps control weeds, insects, and field mice.

He applies limestone, phosphorus, and potash according to soil test requirements before setting out new fruit trees. Thereafter, he applies limestone and boron every 5 years, and adds fertilizer each fall and spring.

Grammer estimates that his production has increased 20 to 25 percent as a result of using modern methods and technology, including soil and water conservation measures.

The Grammers' son, Garry, 17, plans to enter college next year to study horticulture, sales, and marketing so he can return and help his folks run their successful orchard business.

Wind Erosion Control In Vineyards Helps California's Cucamonga Area

By John O. Dean

CONSERVATION farming practices are taming wind erosion in California's famed Cucamonga vineyards.

Chief among these measures are use of volunteering winter-growing cover crops, utilization of pruning residues, and mulch tillage. They are being planned and applied with Soil Conservation Service technical help by grape growers in the West End Soil Conservation District, with which the Cucamonga-Mountain View district was consolidated in January this year.

The author is area conservationist, Soil Conservation Service, Riverside, Calif.

There is more work to be done—in learning the best timing of operations, in improving cover crops, pruning management, and equipment, and in planting windbreaks. But the wind erosion control program in the Cucamonga vineyards has been so successful that a local ordinance has been passed that will bring the last individual growers into it.

The economic and other beneficial results are area wide: Because farmers are more prosperous, business in general is better. Three main highways now stay open the year long, and three main railroads operate without delays in schedules, because sand no longer blows onto the roads and tracks from unprotected vineyards.

Picture a 50,000-acre tract with coarse-textured surface soil thoroughly stirred and dried by winds of 50 to 70 miles an hour, with gusts as high as 100 miles an hour. This was the problem that the SCS was asked to solve in the Cucamonga area of San Bernardino County back in 1937. There were no planted cover crops, and not even any weeds to hold the sandy soil. All grapevine prunings were burned. Under this type of management, farmers would trade sur-

face soil overnight. Blowouts and dunes were prevalent throughout the district.

The present conservation program has developed by painstaking steps from the days when the Cucamonga Civilian Conservation Corps Camp boys demonstrated that dunes could be leveled and blowouts filled by bulldozers—and the wind. Prunings were hauled from the dunes and placed in the blowouts. The wind, loaded with sand blown off the dunes, dumped it in the prunings, thus lowering the dunes and raising the level of the blowouts.

Next, cover crops were planted and, to everyone's amazement, they and the grapes both grew on the scant rainfall moisture. Winter cover cropping became a popular practice. But the disk tillage commonly used erased all the protection so that each fall it was necessary to start over, because the sandy soil was dry, single-grained, and ready to blow again.

In 1941 and 1942, a number of commercial sweep-type implements were brought into use to kill the cover crops and keep the residues on the surface. None of these tools was designed for vineyard use, however, especially where prunings were kept on the soil surface; so the SCS built a specially designed vineyard tiller with sweeps. This implement demonstrated well, but it was not generally accepted by the growers until a late rain in 1947 caused Russian thistles to sprout after the new canes were filling the middles, and the vineyard tiller did the job of controlling the thistle growth.

This experience led to the use of a Canadian-built subsurface tiller that has proved to be a key to the wind erosion control program in the Cucamonga vineyards. It keeps residues on the surface year-long, and keeps volunteering annual seed, such as that of an improved variety of Cucamonga brome grass introduced in the late

L.—Hundreds of carts formerly were used for burning prunings. R.—Wind blew away about 18 inches of soil before conservation protection.

Today, prunings are used as mulch, along with mulch tillage, to protect Cucamonga vineyard soils against wind erosion.

Cover crop protects this Cucamonga vineyard while soil is blown from clean-tilled vineyard beyond.

1940's, near the surface where the fall rains cause quick germination. The residues protect the tender seedlings until a cover is well established.

The disks are about gone in this problem area. And no longer do you see 200 metal carts burning prunings and the fields kept clean-tilled throughout the year. Now, the prunings are kept in the field, and a roto-beater reduces them to small pieces that do not clog tillage implements. Almost every vineyard produces a cover crop, though some fields still need better cover crops, which are being developed. Virtually all of the farmers' new tillage equipment money is buying subsurface tillers, and many of the growers are using extra money now received from their grape crops for irrigating their vineyards.

Sod—Cover Crops—Contouring Solve Michigan Orchard Problems

By W. D. Miller

Sheet erosion caused by one rain in cherry orchard.

TWENTY years ago virtually all orchards in the famous "Fruit Ridge" area of Michigan were being open tilled and the life of an orchard was in many cases limited by the number of years that a spray rig could be pulled across the gullies. No sod or cover crops were used. Each rain washed deeper gullies in the sloping land.

Today, almost all of the orchards in this west central part of Michigan are in sod. The rest have cover crops between the rows of trees.

When the West Ottawa, South Muskegon, and Northwest Kent soil conservation districts were formed, the problem of soil and water loss in orchards was recognized in each district; and use of sod, contouring, cover crops, and mulch was recommended. Orchard men have served on the three district boards of directors down through the years.

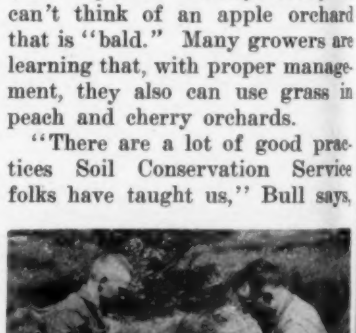
One of them is Kenneth Bull, a charter board member and now associate member of the South Muskegon district established in 1938, and one of the pioneers in the use of terraces and sod cover in orchards. One of his orchards established in the early forties on the contour is still in production.

"Even though modern sprayers make following the contours inconvenient, because occasionally I must go against the wind," he said, "I would still follow this practice if setting out a new orchard on slopes as steep as those where my original orchard is established."

To call attention to the need for sod and other conservation practices on sloping land, the South Muskegon district established run-off plots—still in operation—in the orchard area in 1943, showing the difference in the amount of soil eroded on lands operated with good practices and bad. In 1947, the district board bought 500 pounds of chewings fescue seed and sold it at cost to orchardist cooperators, to encourage sod use.

First to grow this grass in the South Muskegon district, Bull harvested fescue seed in 1949 and sold it to his neighbors for 50 cents a pound. Fescue had been selling for $1.25 a pound. He says today he can't think of an apple orchard that is "bald." Many growers are learning that, with proper management, they also can use grass in peach and cherry orchards.

"There are a lot of good practices Soil Conservation Service folks have taught us," Bull says.



Fred Schweitzer (l.) and Harold Thome examine 4-year-old fescue sod in Schweitzer plum orchard.

The author is area conservationist, Soil Conservation Service, Grand Rapids, Mich.

Erosion in Robert Umlor's orchard in 1938 before he changed from clean cultivation to cover cropping and contouring.

"but if they had never done anything but teach us to use grass it would be worth it. It isn't the gullies that worry me now as I drive through the country—everyone sees them and will try to do something about them. Sheet erosion that takes an inch of topsoil at a time over an entire field is the culprit we must guard against."

Another pioneer in the use of sod, cover crops, and contouring is Robert Umlor in the West Ottawa Soil Conservation District to the south. Before the district was established, in 1938, he tried to slow erosion by filling the gullies with stones and rocks; but each rain took soil and even the rocks down hill. In some cases the roots of the trees were exposed.

His first call for help was directed to County Extension Agent Leo Arnold, who advised the use of sod with straw mulch to help the new seeding get started. SCS employees laid out his original contour lines. By the time the district was started, his farm already was beginning to serve as a conservation example for other farmers in the community.

Today there are no gullies on the Umlor farm. He feels that besides the soil and water saved by a sod cover, it makes it possible for him to raise higher quality fruit with a much better color. Twelve years after he took up soil and water conservation, his apples took first prize at the Michigan Centennial Fair. Today, his only orchards not in sod are those just set out. In these, cover crops are used for the first 2 or 3 years, after which they, too, will go into sod.

When the Northwest Kent district was established in 1946, Lloyd Hill was one of the charter board members. One of the first orchards to go into grass was 20 acres on a farm he bought in 1947 to put into apples. One of the fields had a slope 60 rods long, which had been plowed up and down hill. Close to 95 percent of the orchards in his area were using open tillage—where today he estimates that more than 90 percent are in sod.

He since has expanded until he has more than a hundred acres of apples, pears, and prunes on the home farm. He uses fescue for all of the orchard except 5 acres of prunes, in which cover crops are grown. Straw and hay grown on the other part of the farm are used as mulch under the trees.

"If we had not had soil conservation," Hill says, "we might not even be farming now."

Good sod cover in Anderson brothers peach orchard in Northwest Kent SCD.

Contour Planting—Water Use Serve Florida Citrus Growers

By Howard E. Van Arsdall

SOIL conservation districts in Florida's citrus belt are playing an increasingly important role in helping grove owners in maintaining citrus as the State's most valuable agricultural commodity through the use of soil and water conservation measures.

Not only is the economy of the State affected by the conservation of Florida's soils that are suitable for orange and other citrus production; about three-fourths of the citrus produced in the United States comes from Florida, with the stability of that production accordingly of concern far beyond its borders. Forty-one percent of the State's farm receipts come from the sale of citrus, in the development of which there has been a rapid increase during the last two decades.

Cover cropping, contour planting, irrigation, and drainage are important among the conservation measures Sunshine State citrus growers are using more and more extensively through soil conservation district and small-watershed protection and flood-prevention programs with Soil Conservation Service technical help. One of the most important in many groves is the planting of cover crops, to help maintain organic matter in the sandy soils, to protect young trees from blowing sand, and to control erosion on slopes.

Virtually all groves in these conservation areas now have cover crop protection. Hairy indigo is the most common summer-growing leguminous cover crop, though Alyce clover sometimes is used. Cool-season plants grown as cover are lupine and small grain.

A newly introduced plant, Arshade bristlegrass, that has the ability to grow in dense shade, is being tried in older "canopied" groves where trees have grown until most of the sunlight is cut off from tree middles, causing a problem in getting cover crops to grow as well as particular susceptibility to erosion damage on sloping areas. The Plant Materials Center at Arcadia has produced the seed of this plant and is conducting trials which so far are encouraging.

Another practice in the canopied groves is "hedging" trees in alternate row middles at 2-year intervals. This hedging permits enough sun to penetrate to obtain cover crop growth and also allows easier movement of equipment.

The effectiveness of contour planting on soils and slopes subject to erosion is reflected in the fact that there is approximately 4,000 acres of contoured citrus in Florida. This practice has been used extensively, for example, in the Pasco, Lake, and Hillsborough soil conservation districts.

Reuel Platt in the Pasco district started planting contour citrus 12 years ago and now has a total of 50 acres planted on the contour. C. F. Touchton in the same district contour planted 75 acres 3 years ago following a Pensacola bahiagrass sod.

"I had intended to plant 'on the square,'" Touchton said, "but changed my mind after seeing the erosion damage to an adjoining grove after the rain in the spring of 1960."

I. A. Krusen, also in the Pasco

Contour-planted citrus grove with Argentine bahiagrass strips between tree rows in Hillsborough SCD.

The author is State soil conservationist, Soil Conservation Service, Gainesville, Fla.

Pumping station and ¼ mile of channel improvement on canal in North St. Lucie River Drainage District watershed project.

district, has a 50-acre contour planting that is 2 years old, in which he grows hairy indigo cover crops in row middles.

Along with contour planting, development of grassed waterways for water disposal frequently is necessary. They usually are protected with bahiagrass, but pangolagrass is equally effective and sometimes is used.

Drainage in citrus groves seldom was used before 1955, because most citrus was on well-drained upland soil. More recent planting of citrus groves on wetlands has increased the necessity for this water-management measure. Open ditches and tile drains are both used.

O. D. Huff, Jr., in the Marion Soil Conservation District in the northern citrus belt has installed tile drains on 119 acres during the last 5 years. He found that after the drains had been in for some 2 or 3 years and the tree roots penetrated the soil to greater depth, the increased vigor made these trees much more resistant to cold damage —an important consideration in the northern part of the citrus belt. A. P. McLeod in the same district has installed drainage in approximately 105 acres in his citrus grove, and says the results have been comparable to those reported by Huff.

The value of conservation irrigation in citrus production also has been demonstrated repeatedly. There also has been a marked increase in citrus irrigation during the last two decades. Particularly outstanding has been the increased availability of irrigation water as a result of watershed conservation project developments. Experience in the Sebastian River project in the Indian River Soil Conservation District is one example:

Within 2 weeks after completion of one structure at the peak of a drought season in March 1963, 13 portable and temporary pumps were pumping irrigation water from a lateral into citrus groves and pastures where many artesian wells had ceased to flow, pasture grasses were dying, and citrus had begun to wilt. Conversion to permanent pumping plants is under way.

One pumping plant, installed several months earlier in anticipation of this water supply, was delivering 24,000 g. p. m. of irrigation water to 360 acres of young citrus. The water stored in the canal by this structure provides a supplemental source of irrigation water that is readily available to 4,200 acres of citrus, 2,800 acres of improved pasture, and an additional 1,500 acres planned for citrus.

After completion of work, also last March, at the pumping station and at two structures in the North St. Lucie River watershed project, there were approximately 14,500 acres of citrus irrigated. There were 50 pumps operating in this canal, pumping an estimated 1 million gallons of irrigation water a minute during the dry season this spring. This irrigation of citrus during the 1963 spring drought will permit maximum production in most of the citrus groves in the area served by this part of the watershed project.

It is estimated that grapefruit production will be between 300 and 400 boxes an acre, and oranges between 200 and 250 boxes an acre. No such production would have been possible without irrigation. The 14,500 acres of citrus represents production by approximately 80 landowners. One of them, Walter Dunn, said that otherwise he would not have any fruit crop, as a result of the drought.

Before completing this part of the project, it was necessary to use artesian water for irrigation; but in the past few years, this water source had been so depleted that it was insufficient.

Florida growers and soil conser-

Summer cover crop of hairy indigo in young citrus grove just before disking and working into soil for improvement and protection.

vationists agree that these and other conservation measures will become increasingly important in the years to come. The temperature requirements of citrus limit the area in which it can be grown. As the demand for citrus increases and more intensive methods of production are used, they foresee greater care will be necessary to protect the limited acreage of soils that are suitable for its production.

Native Pecans Now Paying Crop For Kansas Conservation Farmers

By F. DeWitt Abbott and Luther J. Gaskell

CONSERVATION farmers along several southeastern Kansas streams are turning a bottom land native pecan tree into a profitable crop for themselves and a source of additional employment and income for the area.

A species of the hickory (*Hicora pecan*), the scrub pecan has been growing for years along the river bottom lands of the Marais des Cygnes, Neosho, and the Verdigris and their tributaries, usually well mixed with weed trees and underbrush of various kinds. There were a few improved groves where pecan trees were cultivated for their nut meats, but most of the native woodlands were used for harvesting the better hardwoods.

It wasn't until the 1950's that the new interest in pecans began; and local people mark 1960 as the year that the pecan industry finally came of age, when the pecan nut harvest in this section of the State was about $3 million, at around 30 cents a pound. Now, pecans are considered one of the major crops of the area. It is estimated that approximately 10,000 acres have been cleared for nut production in this area, and more conversion of bottom land woodland areas to nut orchards as part of farm and ranch conservation programs is planned.

Soil Conservation Service technicians have found that the pecan trees make their best growth and attain their largest size on deep, rich, moist soils. In most cases, extensive clearing operations are required. Best yields are from mature trees spaced 70 feet apart. For added value, the grass understory in many of the orchards is being used as pastureland, which does not need fertilization and helps prevent erosion on the frequently overflowed bottom lands.

The processing of the nuts is a growing industry in the area and is bringing in additional income. Well-tended, properly grown trees can produce 800 pounds of nuts each in a good year, and some trees have yielded as much as 2,000 pounds an acre. The average yield, with good management, is a little better than 1,000 pounds an acre.

The Kansas native pecan nuts are in demand from candy makers and bakers. The cracking percentage also is high, averaging about 40 percent, compared to the national average of 35 percent or less. Some Kansas trees yield more than 50 percent meats.

George Elmore of Chetopa, a cooperator in the Labette County Soil Conservation District, began clearing weed trees and underbrush from 120 acres of his river bottom land in 1954. In 1960, Elmore harvested some 12 tons of pecan nuts from his improved groves. Half the nuts customarily go to the pickers. Even so, Elmore netted about $30 an acre from the crop. He estimates clearing costs varied from $50 to $100 an acre. He plans additional selection, thinning, and fertilization to reach top production.

"Prior to treatment my woodlands were a regular jungle," Elmore recalls. "I sold a few merchantable trees occasionally, but the income each year wasn't enough to pay the taxes."

It was a big step for Dale Conard, also of Chetopa, to decide about 10 years ago to convert 300 acres of heavy timber into a pecan orchard.

"I spent nearly $10,000 on machine hire and labor one winter in the clean up," he points out. "But there is good interest on the money, and I expect to pay the investment back in 5 years. Another 40-acre plot was cleared at an expense of $1,500. Nuts harvested the first year paid the bill in full."

The Conards were so pleased with their success that they planted 50 acres of cropland to pecans in 1962, and plan to plant an additional 200 acres to pecans and black walnuts this fall.

The Conards also are using improved pecan grove management, including pest control and mowing the grass each fall to facilitate

The authors are soil conservationist, Salina; and work unit conservationist, Altamont; both of the Soil Conservation Service, Kansas.

Native pecan land on Blackledge farm during clearing—small brush with bulldozer and large trees cut or blasted out.

Cultivation involved in growing soybeans approximately doubled nut yields from pecan trees on Elmore farm.

Elmore grazes part of pecan grove—which he says "was a regular jungle before clearing."

harvesting. To reduce nut losses caused by rodents, birds, and weather, they use tree shakers to speed up harvesting. They also mark trees for removal that fail to produce quality nuts, to make more room for the remaining trees.

Processing the nuts into nut meats is the Conard family's latest expansion move. They bought a small cracking unit in 1962 to "learn the trade." Just learning, they processed 40,000 pounds of nuts last year, and already are sold enough on the business to invest $75,000 in buildings, cold storage, cracking, and processing equipment. The new processing works will employ about 20 people during the harvest season in the cracking, bagging, storing, and shipping of an estimated quarter of a million pounds of pecans and a half million pounds of black walnuts.

Walnuts shells are an important byproduct. Conard has already signed a contract for his 1963 shells, which are used in removing carbon from jet airplane engines. He and his pecan-growing neighbors hope also to develop a market for the pecan shells, which are sometimes used for mulching in nurseries. Even if they don't, they believe pecan farming is here to stay. Confidence in the future of their new industry was bolstered last year by a new buyer's order for "all the meats available of this quality."

Have You Seen?---

• "Rural Recreation, New Opportunities on Private Land," USDA's Miscellaneous Publication 930. This booklet calls attention to facilities and activities already available and others to come on private land close to home. Included are vacation farms and ranches; camps and picnic grounds; community, watershed, or rural-urban projects; swimming and boating; fishing and hunting; winter sports; camping; and nature study.

Grape Growers—Areas

By John L. Kiehl

Mrs. E. E. Beers and daughters pick grapes in high producing Yates County, N. Y., SCD vineyard planted on terrace grade in 1945 and annually mulched or seeded to winter cover crop.

CONTOUR planting and other conservation measures are helping the country's grape growers to keep production at a level profitable for themselves and their areas.

In New York, South Carolina, and other grape-growing States, family farmers and larger commercial orchardists alike have turned in recent years to these modern techniques in grape culture, one of the oldest agricultural arts. They are doing so with Soil Conservation Service technical help available through their local soil conservation districts, and with the benefit of agricultural research and extension information in vineyard management.

Take, for example, New York State, which ranks second only to California in grape production:

This State's commercial grape production is found largely in the areas around the Finger Lakes, in the lower Hudson Valley, the Chautauqua-Erie Grape Belt, and in Niagara County. All are near large bodies of water, for maximum sun, warmth, and protection from frost.

In order to take advantage of favorable climate, commercial vineyards are located on a wide variety of soils, and soil conservationists often are confronted with several problems in helping growers with established vineyards. Some were planted up and down the slope so each row would take care of its own water. Others were oriented to the sun with no regard for slope in rows. Serious erosion has been a common result.

"Head ditches" commonly built by hand between sections of grapes frequently were too small to handle the excess surface water, and little or no maintenance made them a liability. Generally, these ditches have been resectioned and enlarged to give improved protection. Other vineyards were planted in level rows with poor drainage, resulting in interference with spraying and plowing, reduced yields, and vine losses.

Although many growers continue to plow their grapes at least once a year and control later weed growth by harrowing or disking, most vineyardists reduce erosion by sowing a winter cover crop at the last cultivation. Hay or straw mulch of about 4 tons an acre is used to prevent erosion, increase rate of intake and water-holding capacity of the soil, and supply potash to the vines.

In setting new vineyards, growers ideally select well-drained, gently sloping sites; but artificial drainage and some land leveling often are used on less well adapted areas. The rows are set on a terraced grade. To assure a good supply of organic matter in the soil before planting, growers often plow down a legume or grass sod before setting a new vineyard.

The grape acreage in New York State has steadily declined, from 62,000 acres in 1930 to about 30,000 acres; but under improved management, yields have been increasing—up to more than 8 tons an acre in the Finger Lakes area—

NEW YORK:—Terraced rows, tile drainage, and annual rye cover crop are conservation measures that helped the growth of this vineyard planted in 1960 in Yates County SCD.

The authors are work unit conservationist, Penn Yan, N. Y.; and conservation agronomist, Newberry, S. C.; both of the Soil Conservation Service.

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so that the total tonnage has remained about constant and the present acreage is expected to take care of normal market expansion.

Improved grape production has paralleled the expanded operation of soil conservation districts since 1941. The districts, with SCS technical assistance, have helped growers in the improved conservation management of existing vineyards, and have encouraged contour planting of new vineyards.

South Carolina, which produces approximately 3.6 million pounds of grapes a year, provides another example of how conservation plays an important role in the growing of a crop that is bolstering the income of several thousand farm families and providing added community employment. New impetus has been given vineyard cultivation in this State through an association which assures member-producers a set market for quality grapes, and by a juice processing plant built in Spartanburg by the producers' cooperative for its members.

Of a total of 1,800 acres planted since 1958, about 1,400 acres, or 80 percent, have been laid out in soil conservation districts by SCS technicians, who also give farmers help in planning the installation of soil and moisture conservation measures.

Most South Carolina vineyards are in the Piedmont and Upper Coastal sections, where sloping lands with adequate air drainage are best suited to grapes. They usually are planted with rows graded into grassed outlets for disposal of excess water. W. T. Warlick, Jr., whose 40-acre vineyard is on uniform and gentle slopes in York County, has been successful in planting his vines in straight rows, across the slope.

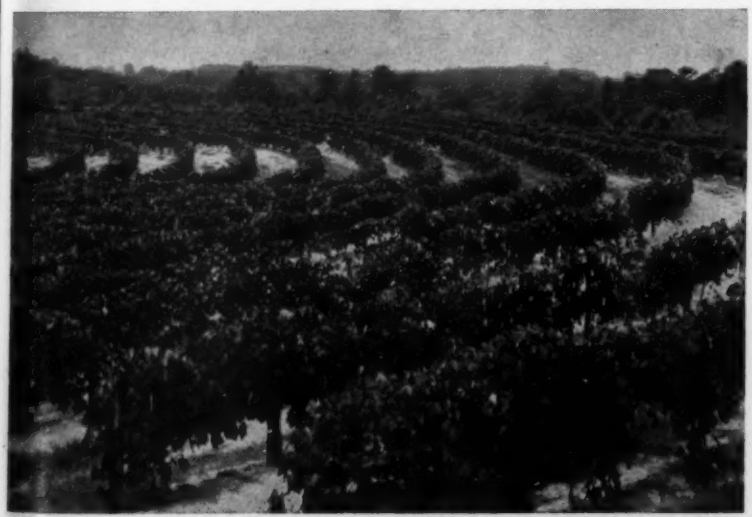
Spartanburg County, one of the Nation's leading producers of peaches, also is the State's top producer of grapes. South Carolina grows mostly Concord grapes, to meet juice processing plant needs for a variety with high sugar content.

Fairfield County, S. C., SCD Supervisor H. C. Good in his conservation-managed vineyard.

Mrs. Wilbur Taylor, J. G. L. Compton, and Frank Bush are typical of Spartanburg County growers who sell almost all their crop to the local juicing plant, which processes about two-thirds of the State's grapes. Some of Mrs. Taylor's grapes last year had a sugar content of 22 percent, the highest reported to date by the plant. Compton and Bush, both also peach growers, plant 15 acres of grapes each. Compton's 1962 yield was almost 6 tons an acre.

Most producers in the county get a yield of 4 to 5 tons an acre and realize a net income of about $150 an acre, about the same as from peaches. S. C. Gambrell, veteran vocational agriculture teacher in Laurens County, sells some of his grapes locally at about $4 a bushel and the remainder of his crop to the juice processing plant at $80 a ton. Fifty bushels weigh a ton.

Farmers who grow peaches and grapes can use much of the same equipment for cultivating, treating, and harvesting both crops and thus cut down on the cost of equipment. Peaches are harvested from June to August, the season ending about the time the grapes begin to ripen.



SOUTH CAROLINA:—Contoured vineyard on Vernon Grant farm in York County, with vines planted on slightly elevated rows forming miniature terraces.

FRUITS OF CONSERVATION

By Clyde T. Lowe

Concrete-lined ditch across head of orchard and metal control gates to each tree row have cut Daley's (l.) irrigation water use at least 50 percent. Howard M. Roper of SCS (r.).

MORE and better fruit produced at much less cost is Donald Daley's reward for using a soil and water conservation system on his Utah apple orchardland near Payson.

"Proper use of irrigation water and good, careful management in my orchards are the principal keys to quality fruit," Daley says. "Eighty-five to 90 percent of the 15,000 bushels of apples produced in 1962 graded out 'Extra Fancy' and 'Fancy Red' in the U. S. Combination Grading System."

Daley's 52-acre, 16-year-old orchard is on 5 percent slopes on the eastern side of "West Mountain," and contains approximately 2,300 Delicious, Rome Beauty, and Improved Jonathan trees. Peach production also has been good the past dozen years, but the "interplant" of peach trees has been removed.

Daley's principal market is in California, for which his apples are specially packed; but 3,000 bushels of extra fancy Jonathan apples were marketed in Salt Lake City in 1962. Some of the larger trees have produced up to 35 field boxes each, and the average production of Red Rome and Jons' in 1962 was 12 to 15 bushels to the tree. A good crop of Delicious apples was marketed in 1962.

Management of water supplied through concrete irrigation ditches is a big factor in Daley's top fruit production, along with an intensive spray program, an adequate fertilizer schedule, proper pruning, and care in harvesting and marketing.

Before he started cooperating with the Nebo Soil Conservation District 6 years ago, inefficient water distribution and uneven tree growth resulted from irrigation runs extending the entire length of the 60- to 70-rod rows; heavy disking caused severe root pruning adversely affecting tree growth; and excessive loss of soil moisture resulted from the surface soil's being left exposed and vulnerable

Size of apple trees indicates effective orchard management—including cover crop holding soil in place on 5 percent slope.

Note.—The author is work unit conservationist, Soil Conservation Service, Payson, Utah.

to erosion. With the help of the Soil Conservation Service and the County Agricultural Agent, Daley revamped his orchard-management practices.

Today, his irrigation runs have been cut in two. He will catch runoff in ponds and pump it back up the field for re-use. Irrigation is carried out by flooding the entire ground surface evenly. Tree and fruit production over the orchard is rapidly becoming uniform, with less water used.

"Since I have constructed the concrete ditch I receive 'full measurement' at any place along my orchard," Daley has found. "With the water now being delivered all I have to do is see that it is evenly applied. To assure myself of this I now use a soil auger before, during, and after each irrigation. This helps me determine when water is needed, and how much is needed. The auger showed me that I was putting water into the soil much deeper than the 4 to 5 feet required by the tree roots; so I now use a large stream of water for a shorter period of time. I try to maintain that 4-foot root system."

Daley uses four to five irrigations each season, including fall irrigation to insure water for his trees during winter and spring. The 20 to 25 acre-inches of water he now needs for the season compares with approximately 60 acre-inches he formerly used.

"Very little water now runs off my orchards," Daley says, "and I save approximately $1,000 a year in cost of water and labor to apply it. The value of the additional cross ditches is so great that the inconvenience to orchard operation is insignificant."

By eliminating disking—to avoid cutting the trees' feeder roots—and establishing a good cover crop of orchardgrass and sweet clover, the Utah orchardist also has protected the soil with a mulch layer. Dwarf orchardgrass, a new variety developed by the SCS Plant Materials Center at Aberdeen, Idaho, will be used for cover crops in the future. Meanwhile, he is a firm believer in using barnyard manure, as an important factor in the color and firmness of the apples. He applied 400 tons to his orchards last year, supplemented by late fall application of ammonium sulphate.

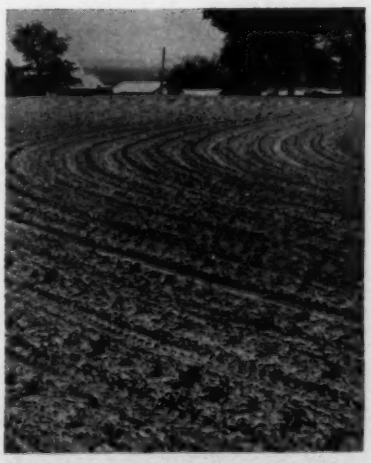
Conservation Berry Farming—

Formula for Family's Success

By Fred B. Alcorn

IF you like berries visit the Leo Stadelbacher family near Cobden in southwestern Illinois. They grow strawberries, raspberries, blueberries—and tomatoes—on the 80-acre conservation-managed family farm on which they also have raised and educated six sons and two daughters.

This has always been a family business, making use of extra help at peak periods, from the start of strawberry harvest about May 15 until tomatoes are harvested by the end of July. As many as 100 extra migrant workers, some of whom have been returning for the last 17 years, are employed in some harvests. The Stadelbachers have four packing sheds, where skilled workers package the fruit and vegetables in "Blueberry Hill Farm" containers for shipment to market.



Terracing and contouring control erosion and conserve mosture in new Stadelbacher strawberry field.

Stadelbacher bought the first 40 acres of their present farm when he was discharged from the army after World War I and married Mrs. Stadelbacher. Asparagus and rhubarb were the principal crops produced in 1919; but rootrot put him out of rhubarb production after one year. He shifted to tomatoes, raspberries, and strawberries, and continued to grow asparagus for about 10 years, until it ceased to be a profitable crop.

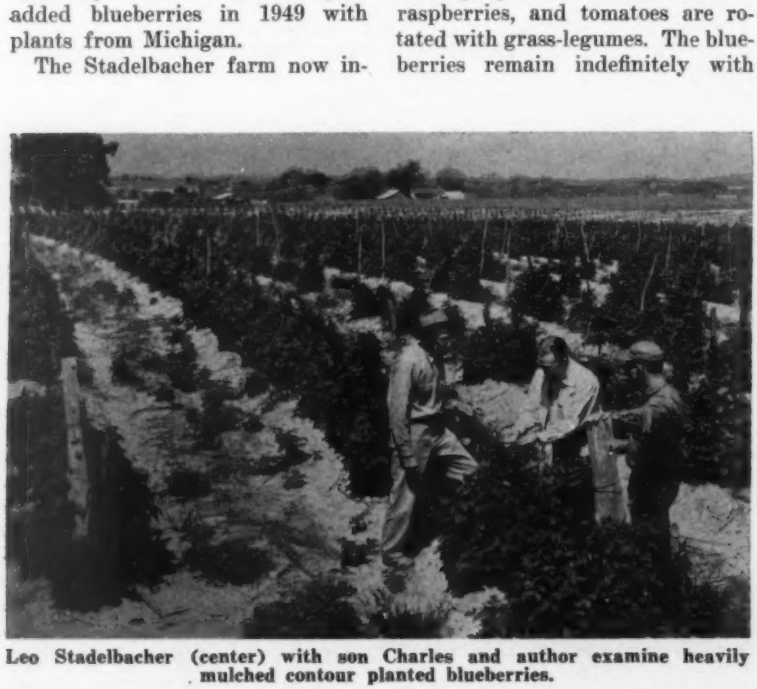
He grew peaches for a while until 1931, when six carloads of

The author is work unit conservationist, Soil Conservation Service, Anna, Ill.

Rye cover crop mowed to serve as mulch between blueberry rows, with irrigation pond in background.

choice peaches didn't net enough on the Chicago market "to buy a pair of baby shoes." Raspberries, however, were so profitable that in 1937 11 acres finished paying for their original 40 acres. Although told they would not live here, he added blueberries in 1949 with plants from Michigan.

The Stadelbacher farm now includes 11 acres of blueberries, along with 20 acres of strawberries, 3 acres of raspberries, and 6 acres of tomatoes. The remaining 40 acres is in grass-legume cover for disease control and soil improvement purposes. The strawberries, raspberries, and tomatoes are rotated with grass-legumes. The blueberries remain indefinitely with grass cover between the rows.



Leo Stadelbacher (center) with son Charles and author examine heavily mulched contour planted blueberries.

Stadelbacher began using soil and water conservation practices in the 1930's when a Civilian Conservation Corps camp was set up at Anna, about 5 miles away. He built terraces and applied other practices with the help of the Soil Conservation Service technicians at the CCC camp and has practiced conservation farming ever since. When the Union County Soil and Water Conservation District was organized in 1947, he became a cooperator and has worked closely with the district.

When the Stadelbachers bought 40 acres more across the road in 1946, it too was put under a complete conservation plan, including terraces with grass waterways, stabilizing structures at waterway outlets, four ponds that supply water for irrigation, use of cover and green manure crops, and proper land use.

Charles, the youngest son, is taking over active operation of the Stadelbacher family farm as his father gradually steps aside.

Norbert, a veteran of World War II, in which his brother Karl lost his life, attends Southern Illinois University and helps in the farm operation.

Robert, who is employed by Agricultural Research Service at Southern Illinois University at Carbondale, raises beef cattle on a nearby farm, and also has been a long-time cooperator with the Union County district. Glenn, who has a Ph.D degree, is a horticulturist for the State of Maryland. Earl graduated from the University of Illinois in entomology this year.

Daughter Geraldine is a business school graduate and housewife. Marjorie is a graduate of Southern Illinois University and teaches art in the East Alton schools.

The Stadelbachers will tell you that sound husbandry, including good soil and water conservation, has helped them achieve both of their goals—to build a successful farm and a successful family.

Timing Peach Orchard Cover Crops To Cut Down Moisture Competition

By C. S. Britt and R. R. Robinson

COVER crops are effective in providing protection from excessive water runoff and soil erosion on the higher sloping lands on which peach orchards usually are planted because good air drainage reduces frost hazards during the spring. But because a vigorous cover crop uses large quantities of water, especially during clear, warm days, there is a problem of preventing competition with the trees for soil moisture during dry seasons.

At Lynchburg, Va., for example, as in most of the Eastern United States, precipitation during the fall and winter greatly exceeds potential evapotranspiration, but during late spring and summer rainfall is less than potential evaptranspiration. It is apparent that competition for moisture is not a problem during fall, winter, and early spring. During late spring and summer, however, water supplies often become critical, and every precaution must be taken to insure efficient use of water.

Cover crops must not be allowed to compete with trees for soil moisture at this time, especially on soils low in available water-holding capacity. In southern areas, where fall and winter rainfall is heavy, winter cover crops will absorb nutrient elements that otherwise would be lost by leaching.

The ideal cover crop is one that becomes established quickly in the fall, forms a good sod, grows rapidly during the cold season when water is abundant, dies before competition for water becomes a problem, and does not harbor insects or diseases that adversely affect peach trees. No one cover crop has all of these desirable features.

Thus grass sods are especially effective in improving soil structure; but grasses start slowly from seed, and fall seedings may not provide a good cover over winter. Rye, although not a sod former, can produce a good soil cover in a short time, if it is heavily seeded and well fertilized. Rye or a mixture of rye and vetch is widely used and is adapted over a wide area.

No. 71

This is the seventy-first of a series of articles to appear from time to time in explanation of the various phases of research being conducted by the Department of Agriculture on problems of soil and water conservation.

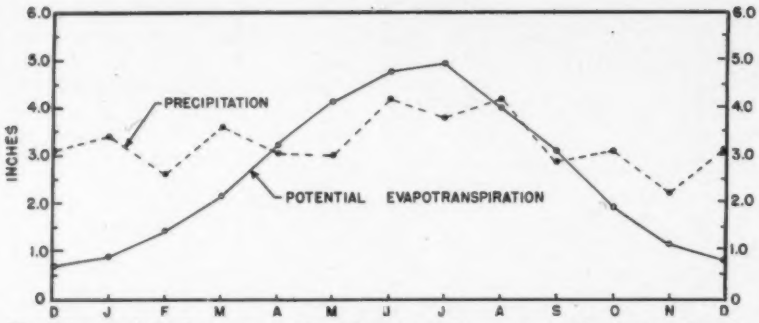
Cover crops should be disked early enough in the spring to prevent competition with the trees for water. The disking should be light, however, so that much of the residue remains on the surface to provide erosion control. This practice is adapted to both old and young orchards. Additional diskings during the summer may be necessary to control weeds.

Orchard plantings that permit contour cultivation as well as cover cropping are particularly effective in soil and water conservation. Recent developments in the use of weed-control chemicals for killing grass sods offer interesting possibilities for maintaining a mulch with a minimum of tillage operations.

Frost hazard is a major consideration in managing cover crops in areas with poor air drainage. The soil serves as a heat reservoir that provides some protection from frost damage to peach blossoms. Any insulating layer, including a cover crop, reduces the intake of solar radiation by the soil, and also reduces the heat transferred from the soil to the air at night. In areas with poor air drainage, a

Peach orchard protected by cover crop on slope where air drainage is good.

The authors are, respectively, assistant to the northeast branch chief and research soil scientist, Soil and Water Conservation Research Division, Agricultural Research Service, Beltsville, Md.



Monthly precipitation compared with potential evapotranspiration at Lynchburg, Va.

vigorous cover crop or a heavy mulch accordingly increases the frost hazard.

In these problem areas cover crops should be managed so that little vegetative growth or mulch cover is present during periods when frost damage is likely. In northern areas, however, a dense winter cover provides protection to peach trees by decreasing soil freezing. This protection is particularly important during the years when there is little snow cover.

Conservation Helps Bring Back Puerto Rico's Coffee Production

By J. F. Marrero

PUERTO Rico's $15 million coffee farming business is being re-oriented on a conservation basis to overcome falling yields and growing foreign competition.

Agricultural research and action agencies of Federal and Commonwealth governments have been at work for the past 10 years to improve and stabilize the coffee industry. Intensive cultural practices, based on sound land use and treatment principles applied through soil conservation district programs with Soil Conservation Service technical help, now promise to restore coffee to a leading position in the Puerto Rican agricultural economy.

Coffee production began to decline, after 1900, because of soil erosion, hurricane damage, and insect and disease damage to trees; and because of increased competition from Brazil, Columbia, Central America, and the West Indies, and from coffee-producing countries in Africa and Asia. Yields fell from as much as 500 pounds an acre reached in 1900 to a low of 150 pounds. Yet Puerto Rico remains the principal coffee producing area under the American flag. In 1961, the island produced 260,000 hundred-weights of coffee valued at $14,900,000. Hawaii also grows coffee.

Six-month-old coffee planted on contour, with hillside ditch for erosion control and banana plants for temporary shade.

Decline in production and low prices discouraged coffee culture for years; but it is still grown on about 160,000 acres on 25,000 farms, 80 percent of which are operated by owners. A labor force of about 24,000 is used during the growing season, and is doubled during harvest in November and December. Another 300,000 people engage in processing, marketing, or other activities that depend in some degree upon the coffee crop.

Children become skilled in hand-picking the ripe coffee berries, and are an important part of the labor force at harvest time. Six municipalities in the coffee-producing zone last year rearranged the

The author is soil conservationist, Soil Conservation Service, Santurce, Puerto Rico.

This sun-grown coffee on contour, with row intervals protected by grass, has produced forty pounds an acre 17 months after planting.

school year to accommodate this demand. After 10 months of school, a 2-month vacation was given at the end of the year. Farm children, who are normally kept out of school for harvest, thus were able to attend a full school term. Last year students harvested 17 percent of the total crop.

Coffee is best adapted to the ruggedly mountainous humid section of central and west-central Puerto Rico at elevations of 500 to 3,500 feet. About half the coffee land has a slope in excess of 60 percent. Eighty inches of rainfall on such slopes creates a severe erosion hazard.

A goal is to increase production tenfold—up to 1,500 pounds an acre. This has been done, at least experimentally, by taking the coffee out of the shade and planting varieties that will do well in the sun, such as Bourbon, Puerto Rico Select, and Caturra.

The tree canopy which shaded the coffee also protected the soil. To compensate for this loss of protection, other conservation practices are used. New plantings are on the contour. A grass or legume crop is planted between the rows. Initial temporary cover may be obtained by planting bananas, plantains, or pigeon peas. Heavy fertilization assures adequate growth and good soil protection.

Field diversion ditches, terraces, and permanent sod waterways give additional protection. Good land use is also a part of the program—the steeper areas go into a permanent woodland cover.

These practices, along with the initial establishment of improved varieties of sun-grown coffee, application of limestone and fertilizer, and control of diseases and pests, are eligible for cost-sharing. A Unified Coffee Conservation Program, supported jointly by the Federal and Commonwealth governments, shares the cost.

Good management practices require proper pruning to provide adequate vegetative growth for the next year's crop. Contour planting has not only controlled erosion, but has permitted some use of mechanized equipment.

Soil conservation district cooperators request assistance, also, in the development of water supplies for washing and processing the berries before drying and bagging, all of which is normally done on the farm. Water needs are met by the construction of farm ponds, spring developments, and the installation of hydraulic rams.

With an increase in yields and a reduction in per-unit costs, coffee farmers expect to offset the increasing costs of labor and materials and compete in the world coffee market.

Sun-grown coffee planted on terraces with 30-in. base width and 9-ft. vertical spacing on average 38 percent slope.

Good Soil Management Helps West Virginia Apple Grower

By James H. Conklyn

Owner William Kilmer examines fruit on 6-year-old tree.

WILLIAM H. Kilmer's Swan Pond Orchard 4 miles east of Martinsburg in West Virginia's eastern panhandle is considered by local conservationists and orchardists to be an outstanding example of good soil management.

Conservation soil management is geared to efficient management of dwarf-type apple trees, with which Kilmer is gradually replacing 103 acres of old and mature apple trees in the orchard. With the help of Soil Conservation Service men working with the Eastern Panhandle Soil Conservation District, he has become thoroughly familiar with the soils on his farm and with their drainage and fertility status, and applies fertilizer according to the need shown by soil tests.

Swan Pond Orchard is operated according to a detailed soil and water conservation plan. For example, in establishing a new orchard, Kilmer first removes old tree roots and stones with a ripper and, after the ground is smoothed down, seeds a cover crop of soybeans or rye.

Tree size and fruit in this 6-year-old Swan Pond apple orchard resulted from using high-nitrogren alfalfa mulch.

The young trees are set in the early spring, and annual cover crops are grown for another year to permit additional smoothing of the land. During this period, alfalfa mulch is hauled from other areas to mulch the young trees. Then Kilmer seeds an alfalfa-grass mixture to produce mulch needed to supply the plant nutrients and to conserve moisture for the next 5 or 6 years.

He has found that a young orchard that is well mulched generally needs little or no fertilizer. He has trees 8 years old that have had no fertilizer of any kind for 4 years, and their growth and tonnage of fruit are excellent. Trees mulched with the alfalfa-grass, which has been well fertilized, start to bear fruit for harvest in 6 to 7 years. This is 5 to 6 years earlier than the average for this locality.

Soil organic matter is most important in Kilmer's soil management program. He leaves small limbs pruned from trees around the trees and maintains vigorous bluegrass sod in the established orchard.

Efficient planning and management are not limited to orchard soil management. For example, all young trees set in the Swan Pond Orchard were propagated at

Grafted dwarf apple trees to be used in replacing old trees in Swan Pond Orchard.

The author is work unit conservationist, Soil Conservation Service, Martinsburg, W. Va.

the orchard. Kilmer points out that by doing his own grafting and budding he is sure of the variety he is planting. This home propagation also provides some winter work for his workers.

Kilmer uses "May poles" with binder twine instead of wooden props to hold up limbs full of fruit. The poles and twine stay in place, eliminating hauling and replacing the props each season.

Cover Crops Prevent Erosion—

Produce Tastier Fruit

By John Dixon

ORCHARD Mesa in western Colorado near Grand Junction is well named. Here grows an abundance of peaches, apricots, apples, pears, and cherries.

They used to think that the fruit here couldn't be better. But it is getting better, thanks to a simple conservation practice—cover cropping the orchard floor. Not only does the cover prevent erosion in orchards on the gently sloping mesa and help retain soil moisture, but it helps supply and hold the chemicals that orchardists say produce tastier fruit.

For example, Fred Harbert, one of the first orchard men in the area to change from clean cultivation to cover, considers this step one of the most significant advances in his 30 years of fruit growing. He believes cover cropping improves the fruit quality as well as the total yield.

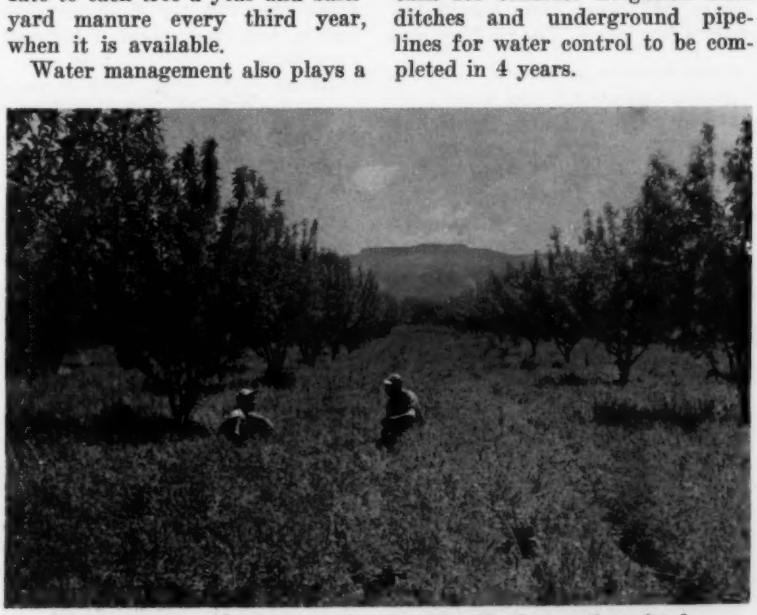
"The best indication I have of this," he said, "is that the demand for the fruit from my place seems to be growing year by year."

Harbert, a supervisor in the Upper Grand Valley Soil Conservation District, uses combinations of cover crops on his 38-acre orchard, each suited specifically to the type of fruit growing overhead. For example, a combination cover crop of equal portions of alfalfa, yellow blossom clover, and orchardgrass is planted in the apple orchard. The alfalfa and clover supplies additional nitrogen. The orchardgrass releases phosphorous and potash for better color.

Harbert does no disking in the growing season. He harvests the cover crops with a roto-cutter similar to a rotary-type lawn mower but larger. He also uses the implement to mulch prunings and return them to the soil. He uses fertilizer with the cover crop —1½ pounds of ammonium sulfate to each tree a year and barnyard manure every third year, when it is available.

Water management also plays a major role in Harbert's conservation orchard management. The length of his irrigation runs is from 330 to 475 feet, and irrigation time does not exceed 12 hours. Harbert uses an irrigation probe to help determine when enough water has been applied. Little runoff water is allowed to leave the farm, because his irrigation system is arranged so that the water can be used on other fields.

Harbert's conservation plan, developed with help of the Soil Conservation Service through the Upper Grand Valley district, also calls for concrete irrigation head ditches and underground pipelines for water control to be completed in 4 years.



Harbert (l.) and author inspect cover crop in Harbert apple orchard.

The author is soil conservationist, Soil Conservation Service, Grand Junction, Colo.

Terraces Stop "Wet Feet" In Ohioan's Peach Orchard

By Earl P. Carlton

HAS the old adage "you can't grow stone fruit on wet, heavy soil" stopped you from growing peaches and cherries? Tom Quick, owner of one of the largest orchards in northeast Ohio, has developed a satisfactory method of growing these fruits on his own heavy soils, thus proving that old adages can get out of date. His solution—terraces or terrace-like ridges.

Quick's 200-acre orchard is 3 miles north of Cuyahoga Falls in Summit County. The entire orchard is on imperfectly drained and moderately well drained silt loam soils. These soils have a medium textured topsoil with a tight, heavy subsoil. With this condition, the water table tends to stay close to the surface. The orchard would produce fine quality apples and pears, but peach trees would live only a few years. The problem was apparently one of "wet feet." Tile drains were tried. However, it was found that trees within a few feet of the tile would live only a few years.

After several unsuccessful attempts to start peach orchards, Quick called on the Soil Conservation Service through the Summit Soil and Water Conservation District, in which he is an active cooperator, to see if some solution could be worked out. In 1956, standard terraces were built on a 6-acre field before planting it to peaches.

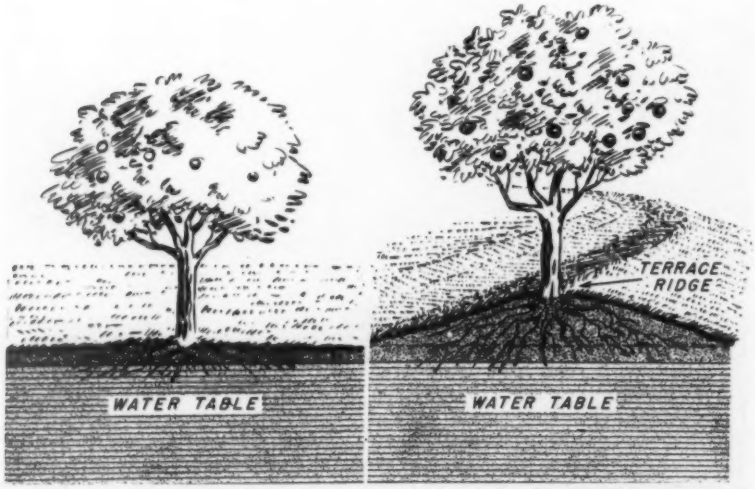
The terraces were spaced 75 feet apart with a gradient of 0.6 foot fall per 100 feet. One row of peaches was planted on the terrace crown, with two rows planted between the terraces. Ninety percent of the peaches planted on the terraces survived the first growing season, but trees planted between the terraces had only 35 percent survival.

Tom Quick (l.) and Robert N. Duncan of SCS with peach trees on terraces.

The next year, ridges similar to terraces were constructed between the terraces. This measure resulted in a 90 percent livability, proving to Quick's satisfaction that the main idea was to keep the tree's roots as high above the water table as possible. He also has excellent overall conservation of soil and water in his orchard.

A second experience confirmed the effectiveness of the conservation structural work. In 1958, Quick removed a 6-acre portion of old apple orchard and, after careful land preparation, liming, and fertilizing, planted it to peaches. In the spring of 1959, only 25 percent of these trees were still alive. Later he put in ridges similar to those used in terraces in the same field. They were spaced across the slope 30 feet apart, and the peach trees were spaced 25 feet apart on the ridges. The use of the ridges resulted in nearly 100 percent live trees and maximum erosion control.

Quick's orchard management practices also include soil tests made every 5 years, liming and fertilizing to maintain good sod and new tree growth, and a complete spray program to obtain top quality fruit.



L.—Tree roots are surrounded by the water table when planted on level ground. R.—When tree is planted on a terrace crown, roots are better able to grow and survive above water table.

The author is work unit conservationist, Soil Conservation Service, Cuyahoga Falls, Ohio.

New Orchard for Old

Pays Off for Oregonian

By **Robert R. Lonzway**

WHEN Frank Hooker's orchard near Milton-Freewater, Oreg., froze out in 1955 he turned to new tree-growing and conservation management practices that put him back into paying production well ahead of the normal time of about 7 years.

The big freeze took out around 4,000 acres of orchards in the Walla Walla valley. Most growers cleared away the dead trees and immediately put in new ones. Hooker decided to wait a year and get better prepared for planting his new orchard. Here is how his extra work paid off:

His 6 acres of cherries yielded 1,000 pounds in 1961 and jumped to 5,000 pounds in 1962. At the same time, 4 acres of apples went from 250 to 720 boxes; and 7 acres of prunes from 12 tons in 1961 to 32 tons in 1962.

The Soil Conservation Service soil survey for the East Umatilla Soil Conservation District, of which Hooker is an officer, showed his gravelly and cobbly soils to be excellent for orchards in contrast to diversified farming. He began his planned orchard rebuilding by subsoiling the old ground four times. It was choked up with dead roots and was packed hard from past cultivation.

Hooker with sprinkler system structure and orchard in 1961.

Hooker established his new orchard in 1958. One practice he used, called "tipping," was to break off the ends of limbs to get a more dense and determined tree growth. Another was to plant a green manure cover crop of Austrian winter field peas in the fall of 1959 and turn it under in the spring of 1960 near the full bloom stage. Hooker also had an irrigation water distribution problem.

Source of water for his sprinkler system is one of many community ditches carrying debris and weed seeds in the water. He put in structures to screen the water, and hasn't had a plugged sprinkler since.

The sprinkler main line of concrete-asbestos pipe was installed with particular care to "bedding," or covering and anchoring the pipe. The structure and pipeline with risers were cost-shared with Agricultural Conservation Program funds.

Hooker put in S-143 orchardgrass for a cover crop. About an acre of the orchard was seeded in April 1961 to an evaluation planting of 5 legumes and 11 grasses, in mixtures and singly. The plan for 1963 called for leaf-analysis and a study of yield and quality of fruit in the evaluation planting.

Hooker has found that the amount and kind of fertilizer to use must be based on common sense and good judgment. Knowledge of the soil, irrigation frequency, management and observation of trees, and cover crop condition are some of the factors involved in planning a fertilizer schedule. Orchard trees are individually fertilized under their drip area in late December or early January. The cover crop receives a minimum of fertilizer in April or May.

The Hooker orchard in fall of 1962 with cover crop of S-143 orchardgrass well established and "Maypoles" in place.

Fertilizers are varied but all include nitrogen. In early May 1962, 22.5 pounds of available nitrogen was broadcast on the orchard. Hooker says sometime in the future one broadcast application on the whole orchard will do for trees and cover crop.

Over a 2- or 3-year period, this Oregon orchardist makes money on the cover crop, something he couldn't do with clean cultivation or a native cover crop. The last 2 years his orchard has been ready for picking 3 to 5 days earlier than nearby orchards.

Hooker is an advisory supervisor and treasurer to the East Umatilla district board of supervisors, and in 1961 he was selected Conservation Farmer of the Year of the district. He also is active in the Blue Mountain Horticulture Society.

The author is work unit conservationist, Soil Conservation Service, Milton-Freewater, Oreg.

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Wenatchee Orchards Take To Cover

MOST orchardists in the Wenatchee, Wash., area sooner or later come to consider cover crops as a must in their operations. The reason: They control soil erosion, improve organic matter and nitrogen content of the soil, make irrigation water more available to the trees, and improve fruit color. Cover cropping is one of the conservation measures growers plan and apply through their soil conservation district programs with technical help of the Soil Conservation Service. As Bob Garrett, a cooperator in the East Wenatchee Soil Conservation District says:

"Fruit color in this area has always been a problem until cover crops were used. By controlling nitrogen with the cover our fruit color has been improving every year. Soil on my orchard has really developed organic matter from red fescue cover crops. When orchards are sprinkler irrigated, moisture stays in the root zone instead of passing beyond the tree roots' reach, taking valuable fertilizer with it."

Rates of seeding and varieties vary from orchard to orchard, because cover crops are used for different reasons on different soils.

Gully erosion from winter runoff in orchard seeded too late in fall to establish cover. It since has been protected with creeping red fescue grass planting.

This cover crop in strips planted in young orchard in May showed this growth by August. A mixture of 6 pounds of alta fescue and 3 pounds of Ladino clover was used.

Photo picture story by David E. Roach, formerly soil conservationist, Soil Conservation Service, Wenatchee, Wash.